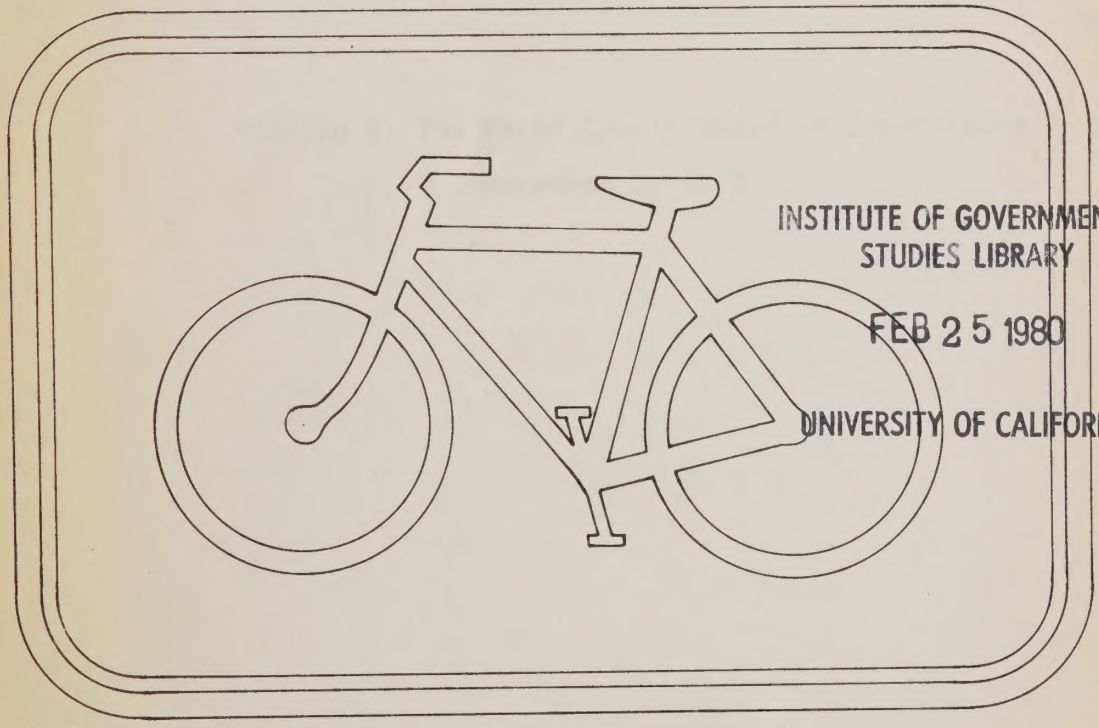
The BICYCLE PLAN



FOR MARIN

Adopted by The Marin County Board of Supervisors

December 2, 1975

THE BICYCLE PLAN FOR MARIN

TABLE OF CONTENTS

		Page
TABLE OF CONTENTS		2
LIST OF FIGURES		3
LIST OF TABLES		3
SUMMARY OF THE BICYCLE PLAN		4
CHAPTER I	- BACKGROUND A. Introduction B. The History and Trends of The Bicycle C. Current Bicycle Activities	6
CHAPTER II	- OBJECTIVES AND POLICIES A. Objectives B. Policies	13
CHAPTER III	- THE MARIN BIKEWAY/BIKE/HIKE WAY PLAN A. Objectives B. Design Features C. Existing Facilities D. The Transportation Element E. The Recreation Element	17
CHAPTER IV	- THE PILOT PROJECT	40
CHAPTER V	- ACCIDENTS, SAFETY, EDUCATION, LICENSING, AND REGISTRATION A. Bicycle Accidents and The Safety Program B. Education and Licensing C. Bicycle Registration Program	41
CHAPTER VI	- IMPLEMENTATION, STAGING, AND FUNDING A. Implementation B. Staging and Costing C. Funding	53
APPENDIX 'A'		57
APPENDIX 'B'		64
BIBLIOGRAPHY		67

LIST OF FIGURES

		Page
FIGURE 1:	Estimated Bicycles Per Capita by Age Group	8
FIGURE 2:	Reasons for Bicycle Riding	8
FIGURE 3:	Multi-Use Recreational Path Sign	19
FIGURE 4:	Bicycle Facility Alternatives	20
FIGURE 5:	Bike Path Cross Sections	21
FIGURE 6:	Bike Lane Cross Sections	24
FIGURE 7:	Typical Bike Route Sign	26
FIGURE 8:	Transportation Bikeway System	33
FIGURE 9:	Recreational Bikeway System	39

LIST OF TABLES

		Page
TABLE 1:	U. S. Bicycles and Users per Capita	7
TABLE 2:	U. S. Bicycle and Automobile Sales	7
TABLE 3:	Bicycle Death Rates	42
TABLE 4:	Bicycle Accident Rates	44

SUMMARY OF THE BICYCLE PLAN

'The Bicycle Plan' for Marin proposes the development of a County-wide system of bicycle facilities to satisfy the many activities associated with the use of the bicycle.

The 'Plan' calls for the delineation of over 400 miles of routes within the County. Approximately 1/3 of these routes are intended to serve transportational needs, while the other 2/3's serve recreational purposes.

A recommendation is made that bicycle planning become a required part of the design of private developments.

Recommendations are made suggesting that various governmental agencies provide bicycle parking and storage facilities at locations where there is an apparent demand for these facilities.

The Plan recommends that a bicycle educational and safety program be initiated in all the elementary schools in the County, starting in the first grade. This educational and safety program could be easily included in the regular recreation program of the schools. The County should provide literature to the schools that can be handed out to the children for their use, and for the education of their parents.

Because of the bicycle thievery problem, it is recognized that there is a need for a bicycle registration program. In accordance with Assembly Bill No. 3329, the County should coordinate a bicycle registration program for the short-run, and for the long-run, the County should encourage the State to inaugurate a State-wide bicycle registration program.

The cost of the entire system is estimated to be approximately $3\frac{1}{2}$ million. There is no intent here indicating that everything must be built. Therefore, the cost could come down significantly if significant portions of this plan were deleted.

Significant sources of funds are available from agencies outside the County. These outside agencies include the United States Department of

Transportation, the California State Department of Transportation, the Federal Park Service, the State Department of Parks and Recreation, and the Metropolitan Transportation Commission.

The Public Works Department and the Parks and Recreation Department will work together, and in conjunction with the eleven cities, CALTRANS, and the Golden Gate Bridge District in implementing this plan.

CHAPTER I: BACKGROUND

A. Introduction

Bicycle use for both recreation and transportation has been increasing significantly in recent years in Marin County and in the United States (Table 1, Pg. 7). Bicycles are being purchased by adults for their own use at a rate unparalleled since the advent of the automobile some 60 years ago (Table 2, Pg. 7). Since that time an extensive network of roads, streets, and highways has been built to accommodate the private automobile. Bicycle use up to very recent times had been pursued only by school children, who abandoned their bicycles in favor of the automobile at the earliest possibility (Figure 1, Pg. 8).

The current bicycle boom has its roots in physical fitness, recreation, rising fuel costs, and 'protect the environment' programs which are on the increase (Figure 2, Pg. 8). These interests have given the bicycle boom a vitality that has caused increasing public pressure for bikeways and routes where bicycles can be ridden with ease and relative safety.

Of particular significance to this plan is the recognition of the fact that there have been dramatic improvements in bicycles that manufacturers have adopted from racing bicycles and incorporated into mass marketing. The modern bicycle for adults is lightweight, fast, and has a variety of speeds, enabling the rider to climb steeper grades than previously possible, and to be able to attain far greater speeds on level ground.

Ten-speed bicycles first came into use about 1960. By 1967, fifteen-speed bicycles had become available. Today is is estimated that around 50% of the 100,000 bicycles in Marin County are of the multi-speed variety. These multi-speed cycles have made the bicycle a potentially viable alternative mode of transportation, in many cases offering greater average speed and more flexibility than the automobile.

With the advent of bicycles that can cope with hills and easily average 10 mph or better on level ground for relatively long distances, the feasibility of the bicycle becoming a significant mode of transportation has greatly increased.

TABLE 1 · U.S. BICYCLES AND USERS PER CAPITA				
	1950	1960	1970	1975
U.S. POPULATION	150,000,000	180,000,000	203,000,000	213,000,000
BICYCLES	—	23,500,000	50,000,000	95,000,000
USERS	19,000,000	35,200,000	75,300,000	100,000,000
BICYCLES PER CAPITA	—	0.13	0.25	.45
USERS PER CAPITA	0.15	0.26	0.37	.47

TABLE 2 · U.S. BICYCLE AND AUTOMOBILE SALES		
YEAR	BICYCLE SALES (MILLIONS)	AUTOMOBILE SALES (MILLIONS)
1969	7.1	9.7
1970	6.9	8.1
1971	8.9	10.7
1972	13.7	11.0
1973	15.3	11.4
1974	14.2	7.4

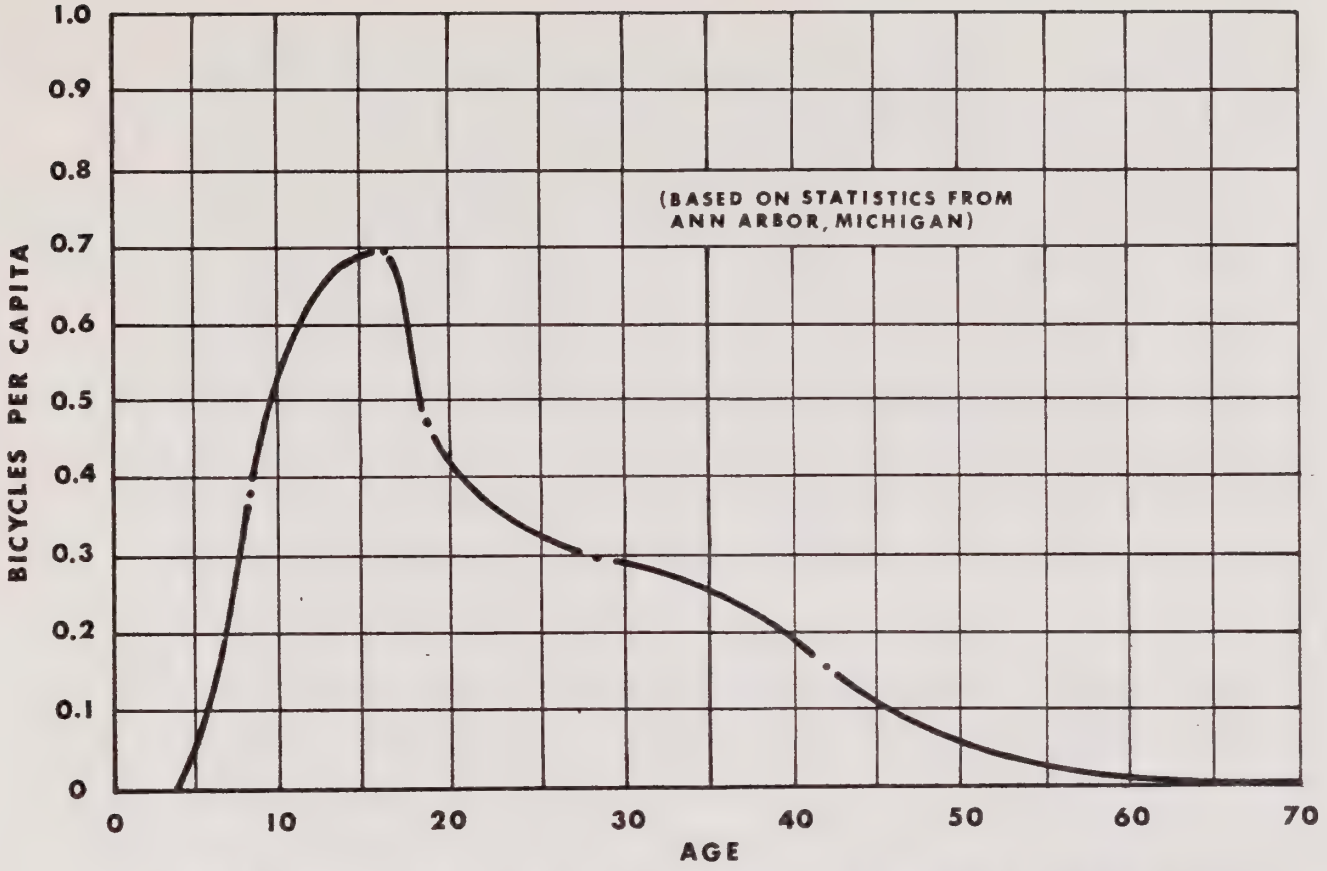


FIGURE 1 · ESTIMATED BICYCLES PER CAPITA BY AGE GROUP

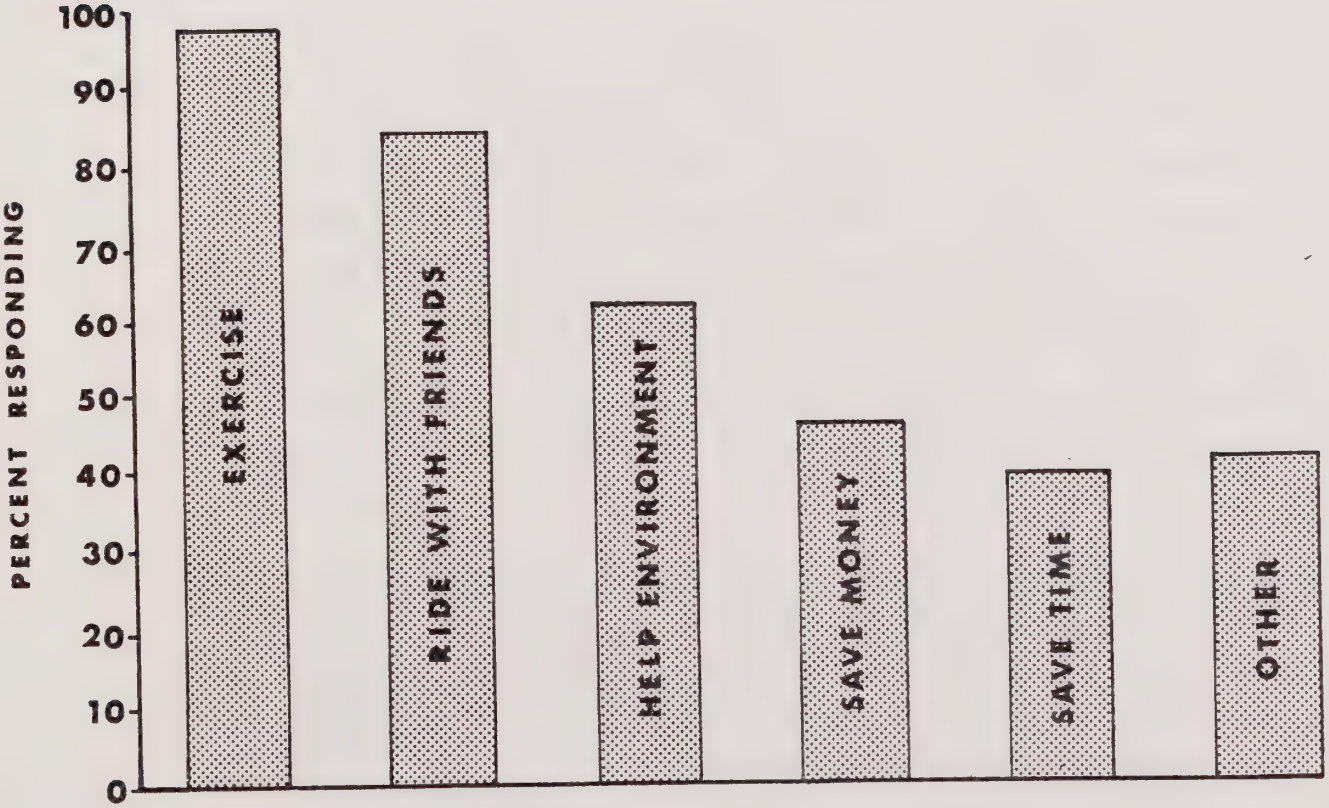


FIGURE 2 · REASONS FOR BICYCLE RIDING

In many countries around the world, the bicycle is, and has been a major mode of transportation. In England, Denmark, Sweden, Netherlands, Germany, Iran, Japan, India, and the U.S.S.R., the bicycle is as important to the transportation system as public transit is to the transportation systems of many American cities.

In 1971, the California State Legislature recognized the increasing use of the bicycle as a viable means of transportation, and called on the Division of Highways to conduct various studies to determine how bicycles could be accommodated on the various street and road systems in the State. The results of some of these studies are incorporated in this document.

Marin County has excellent conditions for bicycle riding. The mild climate is particularly conducive to bicycle use and the mean monthly temperature rarely drops below 50° F. There are usually about 200 clear days per year. The topography of Marin with its narrow valleys and hills, provides many suitable bicycle riding corridors. The scenic beauty of Marin with its proximity to the San Francisco Bay and its many rural pastoral settings and small communities, make it one of the most desirable areas in Northern California for bicycling.

Travel within Marin can be accomplished by automobile with relative ease, however, bicycle travel within the urbanized portions of eastern Marin present many difficulties. In Marin County, as elsewhere, there is a need to identify the problems associated with cycling, and to determine ways in which the bicycle can be accommodated in the transportation system so as to make their use more enjoyable and safe.

In response to this need, in April 1974, the Marin County Board of Supervisors adopted a bikeway policy which is found on page 54 of this document.

In order to implement these comprehensive new policies, it was necessary for the Department of Public Works, Planning Department, and the Department of Parks and Recreation, to work together and in conjunction with, the surrounding counties, the State of California, and the various cities within the County, in order to produce a

comprehensive bicycle plan. This document is the outgrowth of that work.

B. History and Trends of The Bicycle

The first bicycle type vehicle appeared in 1816, and was not dissimilar to the present day vehicle, in that they had two wheels approximately three feet in diameter, connected by a solid frame. Steering was accomplished in a manner very similar to the way present day bicycles are steered. The basic difference between the original version, and todays product is the means of propulsion. The first versions of the bicycle were propelled by the rider alternately kicking the ground with the right foot and then the left foot. The first design improvement implemented on the bicycle was a system of pedalling developed in 1840. By the 1880's the bicycle had come to closely resemble the machine that we are familiar with today.

In 1880 bicyclists from around the Country formed The League of American Wheelmen, and by 1893 claimed almost 40,000 members, and was spearheading many legal battles leading to lighted streets, street name signs at intersections, and the application of "carriage laws" to the bicycle. By 1896, 16 states had appropriated monies to improve their roads for the use of bicycles. "Good roads for bicycles" became a political slogan.

The bicycle was used for sport and recreation, as well as a means of business conveyance, and competed vigorously with the horse and buggy as a means of transportation. Many popular songs developed from the bicycle, such as "On A Bicycle Built for Two". Bicycle parades became exciting events in American cities. One of the largest was staged down Fifth Avenue in New York City, when ten thousand spectators watched 900 bicyclists from The League of American Wheelmen perform their close order drill and martial formations down the Avenue.

The coming of the auto ushered in the "Dark Ages" for the American bicycle. The bicycle industry had generated the smooth roads that

were essential to the infant automobile industry, as well as experience in mass-production techniques and innovations such as differential steering and expansion brakes, which served many needs of the automobile industry. Bicycle repair shops were widely distributed, and were easily converted into automobile repair shops. In the bicycle repair shop of Charles and Frank Duryea the first American car was constructed. The mass-produced automobile was developed in the bicycle repair shop of Henry Ford; and the first aeroplane was built in the bicycle repair shop of the Wright Brothers.

On the international scene, the bicycle has long been popular, primarily for economic reasons. In Copenhagen, as an example, it is estimated that 20% of all travel during peak periods is by bicycle. 25% of all home to work trips in Crawley, England, are made by bicyclists. Studies indicate that 76% of the population of the Netherlands are at least occasional bicyclists. Here in California, it is estimated that 75% of the population of the university town of Davis, are cyclists.

The present rebirth of the bicycle has its roots in the 1950's, when Dr. Paul Dudley White became the advocate of the "health-through-cycling" cause. Bicycling became increasingly popular during the 1960's, as more and more Americans took to bicycling as a means to healthful exercise, and as a means of getting out into nature.

New bicycle sales have more than doubled since 1965, and trippled since 1960. In 1972 more bicycles were sold in the United States than cars, the first such occurrence in the twentieth century. In 1972, 13.7 million new bicycles were sold, representing a 65% increase in sales over the previous year. All types of bicycles are being sold, included adult three-wheelers, and tandem (two-seater) bicycles. However, the lightweight 10-speed type bicycle is by far the most dominant factor in present bicycle marketing, accounting for around 40% of total United States' sales. These adult bicycles range in price from $50.00 to $1,500.00, with the majority in the $100.00 to $500.00 price range.

C. Current Bicycle Activity in Marin County

Bicycle use in Marin County is rapidly increasing. Because of the County's scenic setting, it has become a favorite for weekend recreational cyclists.

Community pressure has been growing in recent years to have the County develop an integrated system of bicycle facilities.

In response to this need, the Board of Supervisors has directed the Public Works Department to develop an integrated Bicycle Plan, addressing the needs of both recreational and transportational cyclists.

Up until 1974, the Parks and Recreation Department was the agency responsible for developing bikeways in the County. In the future, both the Parks and Recreation Department and the Public Works Department will be involved in the development of bicycle facilities throughout the County. The Parks and Recreation Department will be more heavily involved with routes and trails meeting a recreational need, while the Public Works Department will be more concerned with bikeways meeting transportation purposes.

The County encourages the inclusion of bicycle planning in the design of private developments. Such design requirements would be approved by the appropriate agency prior to construction, and as a consideration of approval for development.

CHAPTER II: OBJECTIVES AND POLICIES

A. Objectives

There are several reasons why a Countywide Bicycle Plan needs to be developed.

First of all, there is a need to coordinate and direct the bikeway planning of various agencies operating within Marin County. These agencies include the Marin County Department of Public Works, the Planning Department, the Department of Parks and Recreation, the National Parks Service, the Golden Gate Bridge, Highway, and Transportation District, the California State Department of Parks and Recreation, and the California State Department of Transportation, and each of the eleven cities, and several special districts in Marin County. Previously these entities had operated in a rather isolated manner, without a significant degree of interface, and with no mutually comprehensive objectives in mind. This plan is intended to provide objectives, policies, and direction for provision of bicycle amenities.

Additionally, there is a trend in the United States today, and in Marin County in particular, toward using the bicycle more and more for both recreation and transportation. There is every indication that this trend will continue, and therefore the County as a whole is faced with the responsibility of providing safe facilities for these bicyclists. Of particular importance to the development of this plan is the consideration of bicycles as a viable alternate form of transportation. When planning any street or road improvement, consideration should be given to the bicycle as a part of the traffic mix, whether or not the street or road is part of a designated bikeway. In order for the bicycle to be a viable transportation alternative, the opportunity for a cyclist to ride his bicycle to virtually any destination he may choose should be preserved, restored, or provided, as the case may be. The mere provision of well maintained paved shoulders along as many roads as possible will bring this objective much closer to realization.

It is recognized that much of the existing street and road system is suitable for general bicycle use. The County supports the precept that cyclists are entitled to use all public roads except freeways.

The fact that separate facilities have been, and are being established for some corridors of travel is not intended to affect the cyclist's right to use the roads as well.

The Marin County Board of Supervisors on April 30, 1974, recognized that a bikeway policy is needed to respond to the following:

1. Streets and roads are now planned, designed, and constructed solely for automobile traffic without regard for bicycles. The existing or proposed streets or roads are often the most usable, convenient, and available bikeways if they can safely accommodate bicycles.

2. Bicycles are a proven, readily available, inexpensive, efficient, and environmentally sound means of transportation; transportation planning in Marin has only just started to include bicycles.

3. Recreational bicycle riding has become extremely popular in Marin, with perhaps 50% of the children and adults owning bikes. Few safe recreational paths now exist and those are frequently dangerously over-crowded.

4. The State, County, and cities now all have their own design and construction standards for bikeways, creating confusion and inconsistencies for riders. Many of the present standards are inadequate and unsafe.

5. Bicycle traffic safety is only sporadically taught in schools and riding skill training is not provided at all. A six year old inexperienced bicycle rider can at present, ride on the same public streets, subject to the same laws as a mature, licensed auto driver.

6. Bicycles could be an ideal, individual connector between home and bus, ferry, or future transit. Most of Marin's commuters are within riding distance of bus stops, many already have bikes and the climate is usually suitable; yet no buses in Marin will now accommodate bikes and bus stops have few secure weather-proof places to leave bikes.

B. Policies

In response to the need for bikeways in Marin County, the Board of Supervisors approved a "Proposed Bikeway Policy", on April 30, 1974. The "Proposed Bikeway Policy" is incorporated

in this document as Appendix "A". The central theme of those policies is enumerated below:

1. The County recognizes the need for providing safe accommodation for bicycling in all public streets and roads and encourages cities and the State to do the same for street and roads projects in Marin. New road construction and repair projects shall be planned and designed so as to accommodate bicycles safely as well as motor vehicles.

2. The County recognizes bicycles as a significant transportation mode to be incorporated into transportation planning and construction efforts and to be connected to and balanced with other transportation forms.

3. The County shall continue the program of providing recreational bikeways along scenic routes and connecting to recreational areas. For maximum aesthetic enjoyment and safety, these bikeways should be separate from roads where possible.

4. The County shall develop uniform standards for bikeway design, construction, signing, and safety devices. These standards will be coordinated with the State standards and the County encourages their use by the various cities and other agencies.

5. The County supports bicycle traffic safety education and skills training programs in the schools, police departments, recreation departments, and other organizations directed toward new or young riders.

6. The County will support Statewide and local legislative efforts to establish bicycle safety rules as necessary to supplement the State Vehicle Code and apply to separate recreational bike paths; and will support enforcement and education programs which may be necessary.

Policies and objectives stated in this plan supercede all previous policies and objectives.

On February 4, 1975, the Board of Supervisors, upon recommendation of the Marin County Parks, Recreation and Open Space Commission, adopted the following programs, policies, and standards:

EDUCATION AND LICENSING

1. Mandatory class in bicycle laws, operation and safety for all students early in the primary grades. Accompanying this program, backup material to be sent to all parents of these children.

2. In recognition of the fact that the accident rate for 13-14 year old cyclists is greater than for any other age group, all persons 12 years of age and older must have a license to operate a bicycle on public roads.

3. Motor vehicle licensing literature and examinations should include laws related to bicycles, their handling and safety, and rights and obligations of their users.

REGULATION AND ENFORCEMENT

1. The present right of cyclists to use all motor vehicle roadways is to be maintained everywhere, except that freeways, tunnels and certain bridges may be posted to restrict bicycle use where alternative routes and/or facilities are available.

2. On all high-speed roads, the cyclist must keep as far to the right, on the pavement, as is safe. Paved shoulders, where available and in satisfactory repair, are to be included in the above.

3. Cyclists traveling at speeds in excess of 15 miles per hour are to be encouraged or required to use the streets, rather than compete with slower-moving cyclists on adjacent bicycle paths.

4. All laws pertaining to the operation of bicycles are to be vigorously enforced upon <u>all</u> persons operating bicycles.

5. Bicycle traffic offenders are to be sentenced to a bicycle driving school. If the offender is under the age of 12, his parent must also attend.

MISCELLANEOUS

1. The present optional bicycle registration program should be made mandatory.

2. Recognizing that the most dangerous part of bicycle paths is the intersection with roadways, an effort should be made to determine the safest design, then use it in all possible places.

CHAPTER III: THE MARIN BIKEWAY - BIKE/HIKEWAY PLAN

A. Objectives

The actual physical characteristics of facilities provided for bicycles will vary widely from location to location. Of importance is to provide a safe and agreeable environment for the bicyclists, so that the flexibility of movement for the bicyclists will be as great or greater than the motorist now enjoys.

Statistics can be cited to both support and refute the construction and use of bicycle facilities on and off public roads. Further study and evaluation of existing facilities is necessary. A recommendation for money to support such a study is to be presented to the 1975-76 state legislature (SB 937 Mills). Until such a study is completed and design criteria developed, tested and evaluated, the County can only respond to increased bicycle use (and therefore, an increased bicycle accident rate, Tables 3 and 4) by considering the bicyclist in both transportation and recreational planning.

The following plan responds to this need with the intent of designing facilities that will offer maximum enjoyment and safety to cyclists. It is the intent of this plan to exclude motor vehicles from bicycle facilities.

In no way is the Bicycle Plan to be construed as an attempt to restrict bicyclists to specified routes. It is the herein stated policy of the County of Marin to allow bicyclists in the future, the free access of the roadway which they now enjoy. Bikeways are for the benefit, enjoyment and safety of those who wish to use them. In no way are they (bike/hikeways) intended as a confining corridor which all bicyclists "must use".

B. Design Features

The Plan is based on the following semantic and work distinctions:

- A Bike/Hikeway is a facility shared by cyclists and pedestrians.
- B A Bikeway is a facility designed for exclusive bicycle use.

1. Bike/Hikeways

Bike/hikeways in most cases, will be separate from existing roadways and recreational in nature. In some locations, they may exist alongside and in addition to Class II and Class III bikeways (See following discussion of bikeways). They may additionally be part of a signed transportation route (See Pg. 33, Transportation Element).

Due to the joint use by pedestrians and cyclists, bike/hikeways should be a minimum of ten (10) feet in width for two-way use and five (5) for one-way use. The surface should be smooth pavement. Proper signing should be plainly visible indicating joint use by pedestrians and cyclists (See Figure 3, and Pg. 61).

2. Bikeways

Bikeways are of three types as defined by the California Department of Transportation Design Guide for Bicycle Paths and applied in Marin County. They are: Bike paths (Class I), Bike lanes (Class II), and Bike routes (Class III). (See Figure 4.)

a. Bike Paths

Bike path (Class I) facilities can be constructed along routes parallel to streets and roads, or on alignments unrelated to streets and roads. (See Figure 5.) The chief advantage of an exclusive bike path is that motor vehicles cannot encroach upon it, except at at-grade intersections.

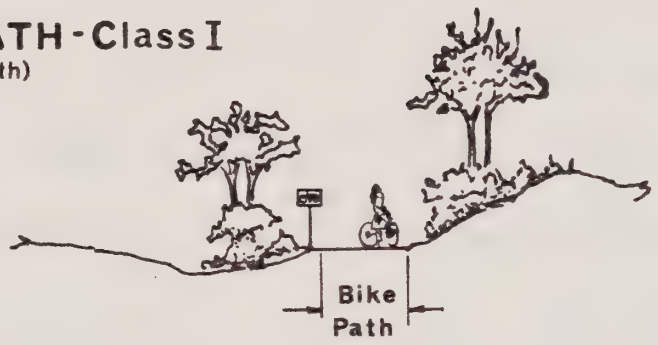
Bike paths tend to be easier to lay out through open spaces and rural areas. Exclusive bike paths are often solutions to the following:

1) To serve schools and playgrounds in cities, if right-of-way is available, and they are built in addition to, not exclusive of, any existing roadways.

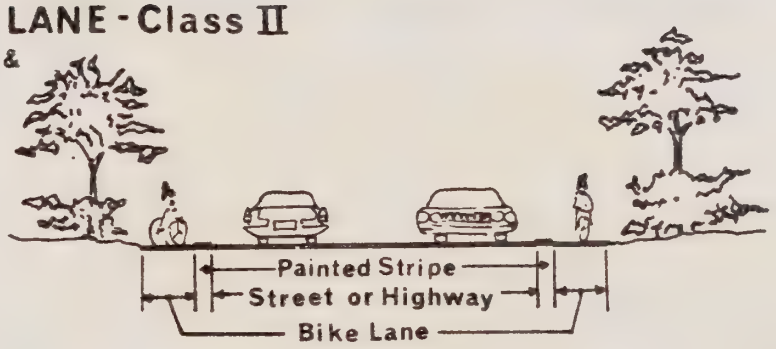
figure 3

BICYCLE FACILITY ALTERNATIVES

BIKE PATH - Class I
(Seperate Path)



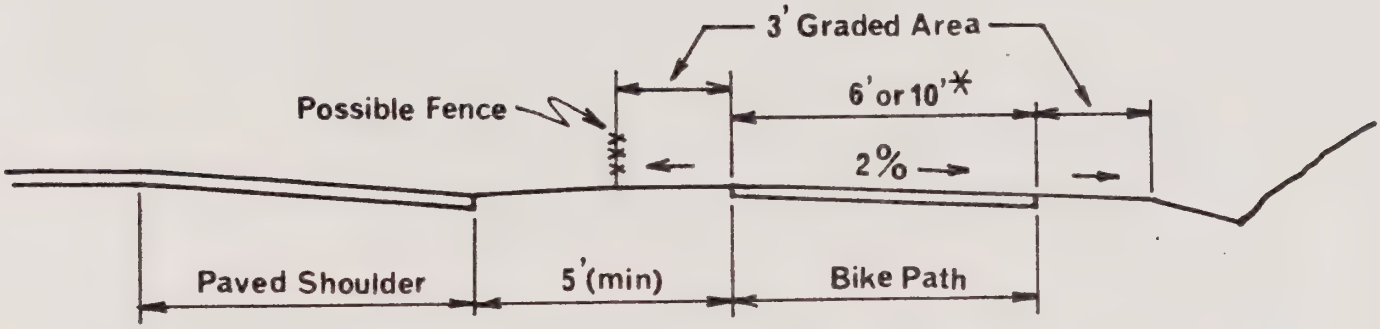
BIKE LANE - Class II
(Striped & Signed)



BIKE ROUTE - Class III
(Signed Only)

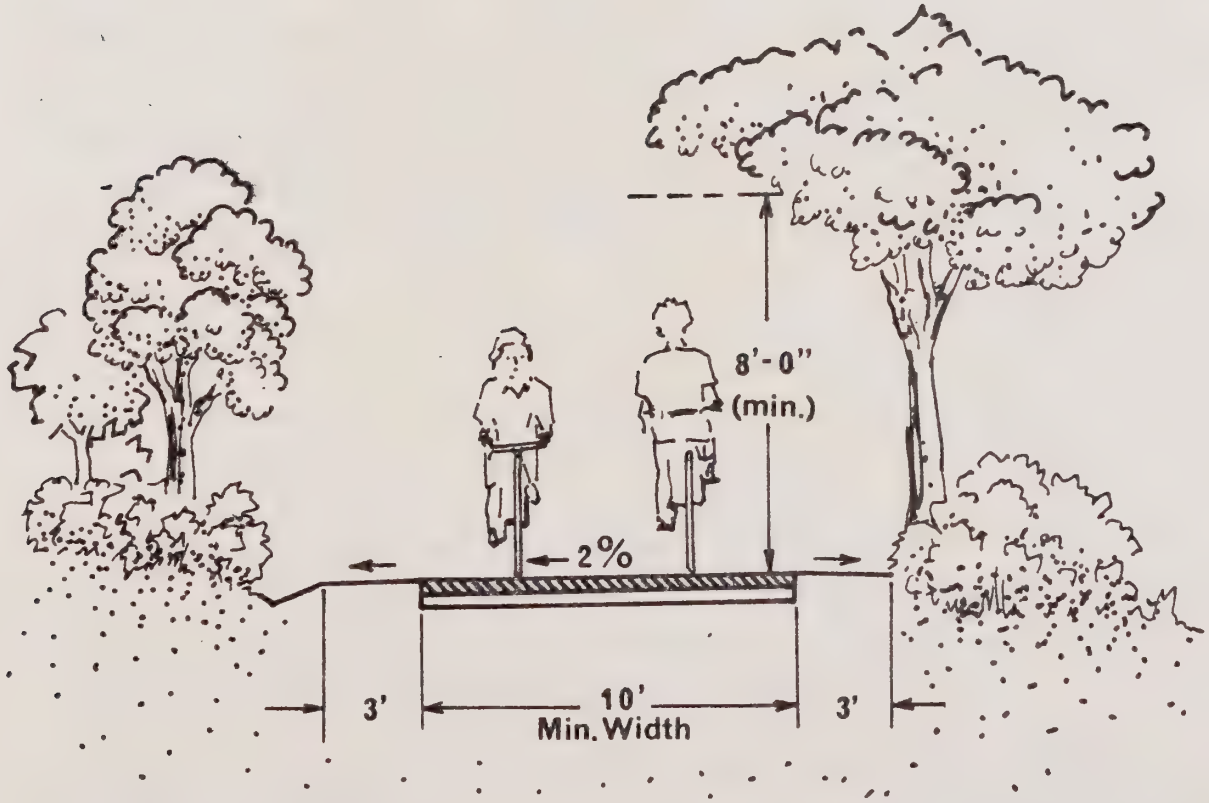
figure 4

BIKE PATH CROSS SECTIONS



* 1-Way: 6' Minimum Width
2-Way: 10' Minimum Width

BIKE PATH ALONG HIGHWAY



BIKE PATH ON SEPERATE ALIGNMENT

figure 5

2) To serve a bicycle demand which would otherwise have to be served by a high speed arterial with heavy traffic volumes.

3) To bypass constricted areas where right-of-way constraints preclude the development of bike lanes.

4) Along natural or man-made features which have few cross roads, such as creeks, streams, abandoned railroads, utility easements, etc., where these features correspond to a reasonable degree with desired routes for bicycle travel, and no available roads exist, or the facility is built in addition to existing roadways.

As implied above, intersections are a prime consideration in bike path design. If alternate locations for a bike path are available, the one with the most favorable intersection conditions should be selected.

The basic typical cross section for a Class I bike path is a 8 to 10-foot paved section with a 2% cross slope within a 14 to 16-foot graded area. The outside graded area should have a flush junction with the path, and slope smoothly and gently away from the path. The 8 to 10-foot paved width is the minimum for two-way use, for passing slower bicycles, and for the accommodation of light vehicles used in maintaining the bike path. A center stripe may be provided to help separate opposing directions of travel. These standards may be varied because of significant physical or environmental constraints.

Where bicycle volumes are heavy (ADT over 1,000), speeds are in excess of 15 m.p.h. (such as on down grades), or where the bike path must be shared with pedestrains (generally not desirable), up to 4 feet of additional pavement should be provided.

Consideration should be given to the provison of simple rest stops and vista points where feasible along bike paths when such facilities are not otherwise available. Such facilities must be built far enough away to prevent congestion on the path.

In general, the use of sidewalks for bike paths is not satisfactory because of conflicts with pedestrains, driveways, building entrances cross streets, etc., as well as sight distance restrictions caused by shrubbery, buildings, signs, etc.

b. Bike Lane

Bike lanes (Class II Facilities) for preferential use by bicycles may be established within the right-of-way of a street or road. Bike lane stripes promote the orderly flow of traffic by establishing a specific line of demarcation between the area reserved for bicycles, and the lanes occupied by motor vehicles. This effect may be supported by signs and additional pavement markings.

Bike lanes should be one-way facilities. This means that two one-way facilities should be constructed on a roadway, one on each side. Two-way bike lanes are unsatisfactory and not recommended for the following reasons:

1) In most cases one direction of bicycle travel will be immediately adjacent to motor vehicle traffic moving in the opposite direction. These bicycles and motor vehicles will close with a speed equal to the sum of their individual speeds, thus greatly reducing the time available for evasive action in an emergency and increasing the force of any collision.

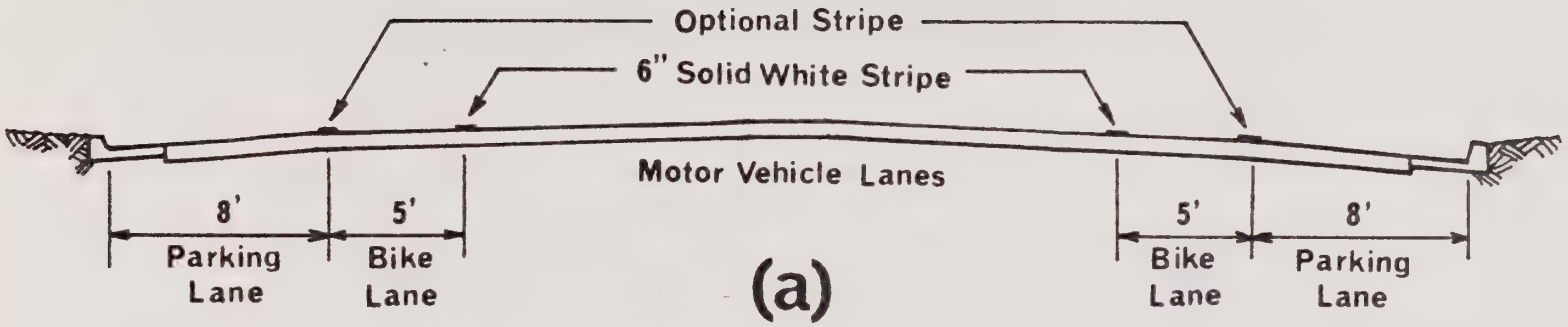
2) Since a motorist who is about to enter a street on which a two-way bike lane is located usually does not expect a cyclist to be approaching from his right on the near side of the street, he concentrates his immediate attention to his left, and may pull out with insufficient clearance to avoid a collision with the cyclist on the near right.

Some typical bike lane configurations are illustrated in Figure 6, and are described below:

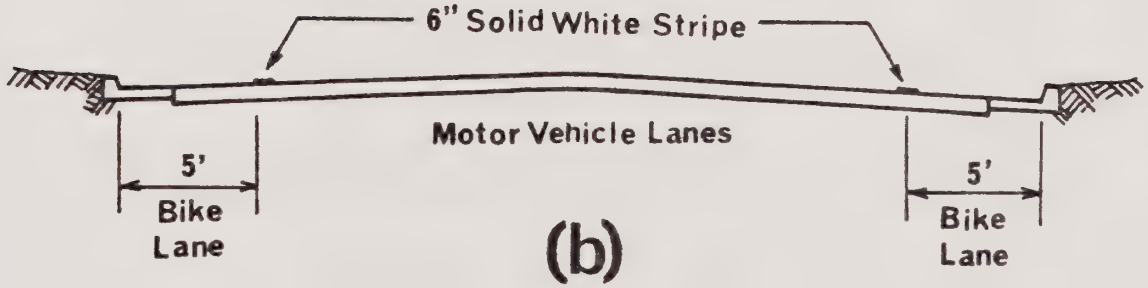
1) Figure 6(a) depicts one-way bike lanes on a city-type curbed street where parking is permitted. Bike lanes are located between the parking lanes and motor vehicle lanes. Widths shown are in the satisfactory range, but may be varied slightly to fit the space available. For example, a foot or two of additional width in the parking lane will help to reduce the hazard to cyclists when vehicle doors are opened next to a bike lane. (In some cases it may be desirable to prohibit parking during peak periods.)

2) Figure 6(b) depicts one-way bike lanes along the outer portions of a city-type curbed street where parking is prohibited. Widths shown are in the satisfactory range, but may be varied slightly to fit the available space. This is generally the most desirable configuration for

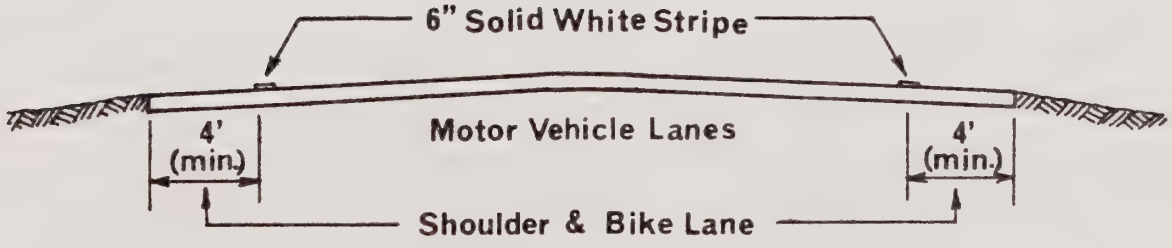
TYPICAL BIKE LANE CROSS SECTIONS



(a)



(b)



(c)

figure 6

bike lane, as it eliminates conflicts with parked vehicles caused by parking maneuvers or the sudden opening of a vehicle door. As a prerequisite, however, it is often necessary to provide adequate off-street parking.

3) Figure 6 (c) depicts one-way bike lanes on a rural-type highway. Widths shown are minimum, and additional width is desirable, particularly when motor vehicle speeds exceed 40 mph.

c. Bike Routes

A bike route (Class III) facility is established by placing "Bike Route" signs along a road that is to be shared by bicycle and motor vehicle traffic. If the road is not wide enough to accommodate bike lanes, it should be marked as a bike route only if motor vehicle volumes are fairly light.

The chief advantages of a bike route are:

1) The "Bike Route" signs alert motorists to watch for cyclists, and thus to some degree make the route safer for cycling.

2) The "Bike Route" signs can guide cyclists to a specific destination or through an unfamiliar area.

3) The "Bike Route" signs may attract use by cyclists, and thus further establish the road as a bicycle facility.

An example of a "Bike Route" sign is shown in Figure 7.

d. Existing Streets and Highways

As a practical matter, until other facilities are developed, cyclists will probably do most of their riding on existing streets and roads that are not designated bicycle facilities. It will be necessary for them to share the roadway with motor vehicles.

Sometimes certain modifications to a roadway, undertaken to improve the flow of traffic, can create hazardous conditions for cyclists. For example, the elimination of shoulders caused by restriping to provide additional traffic lanes or turning lanes may in effect crowd bicycles off the road.

figure 7

When it becomes necessary to modify the roadway cross section, it is desirable to preserve or provide an adequate shoulder for cycling and other uses. If this is not feasible, the outside lane should be wide enough to accommodate joint use. A minimum paved width of 15 feet is recommended for such situations.

The selection of the type of bicycle facility to be provided is influenced by a number of factors. Among the considerations are:

1) Character of the User: Users may include elementary school children with their first 2-wheel bicycles, casual recreational cyclists, commuters, highly experienced individual or club cyclists, adult tricyclists, etc. It is desirable that some facilities, such as those used extensively by young children for access to schools and playgrounds, be separate from motor vehicle facilities, if possible. However, if the users are primarily mature riders, the highway shoulder in many cases will accommodate them adequately.

2) Feasibility: In some areas, such as congested urban localities, it is difficult to provide separate facilities because of right-of-way constraints and frequent intersections.

3) Roadway Conditions: The negative and positive features of such factors as motor vehicle speeds, volume of commercial traffic, parking densities, spacing between intersecting driveways and streets, motor vehicle turning volumes, width and smoothness of shoulder areas, etc., should be analyzed in determining whether a designated bicycle facility can be accommodated on the roadway.

4) Other Factors: Due to the physical demands of cycling, the rider has a great urge to maintain momentum, particularly on trips of more than a mile or two. Thus, where longer trips predominate the desirability of minimizing the number of stops required should be kept in mind. Also, a cyclist will tend to select the most direct route which in his judgement is acceptable, whether or not it is a designated bicycle facility. Thus, in general, bike routes should tend to follow the most direct course between logical origins and destinations.

C. Existing Marin County Bicycle Facilities

Currently there are two Class I (completely separated bikepaths designed for the exclusive use of bicycles) bikeway facilities in Marin. They are:

1) Pacheco Hill Trail - Connecting Ignacio to northern San Rafael, paralleling the west side of Highway 101. (2 miles)

2) Alto Hill Trail - Connecting Lomita Drive to Casa Buena Drive in Corte Madera. (1/2 mile)

In addition, there exist four Bike/Hikeways separated from existing roadways and designed for joint use by pedestrians and cyclists. They are:

1) Stafford Lake Trail - Connecting western Novato with Stafford Lake County Park. (2 miles)

2) Corte Madera Creek Trail - Running parallel to Corte Madera Creek from Bon Air Road to the College of Marin. (2 miles)

3) Tiburon Trail - Connecting Greenwood Beach Road to downtown Tiburon and the Tiburon Ferry Terminal, running along the northern edge of Richardson Bay. (4 miles)

4) Sausalito Trail - Connecting Mill Valley to Sausalito as a Class I bikeway, and then running through Sausalito to the Golden Gate Bridge as a Class III bikeway. (12 miles)

In the final stages of master planning at the moment, is the Cross Marin Trail, a multiuse facility to include equestrian use also. The trail will connect the Larkspur Ferry Terminal in eastern Marin, to Samuel P. Taylor Park in Central Marin, and Point Reyes Station, Inverness and Tomales State Park in Western Marin. This project is discussed in detail in Chapter III.

At the moment the California State Department of Transportation is making adjustments to the Highway 17 Freeway adjacent to San Quentin penitentiary, so that bicycles will have access to Point San Quentin from San Rafael.

Additionally, the California State Department of Transportation is at the moment conducting a feasibility study of the possibility of converting one lane of the Richmond - San Rafael Bridge into a two-lane bikeway on weekends. Assuming everything goes smoothly on this project, the bikeway across the bridge may be open to weekend riders by the mid-summer of 1975.

D. The Transportation Element

Transportation routes are primarily designed to allow a bicyclist to move from one point to another, for such purposes as: commuting, shopping, etc.

Many of these routes located in the urbanized portion of eastern Marin will be used for both recreation and transportation. These bikeways which will be used for both purposes should be given special consideration because of the need to accommodate both uses.

The transportation bikeways are defined as being either arterial or collector.

The arterial bikeways are laid out in such a fashion that they serve to connect the six planning areas in eastern Marin, which are essentially contigious geographical areas. For the most part the arterial bikeways will be either Class I or Class II. The actual determination as to what type of physical facilities will be constructed on the arterials will be made by the Department of Public Works in County areas, and in conjunction with city staffs within city limits. There are 55 miles of arterial bikeways proposed.

The collector bikeways are laid out in such a fashion so as to cover the more densely populated portions of the eastern part of the County, and to provide access and egress to the arterial bikeway system, and to the major bicycle attractors and transit interchange points. For the most part the collector bikeways will be Class II or Class III facilities. There are 80 miles of collector bikeways proposed.

In section "D" of this chapter, there is a list of the major bicycle attractors in Marin. At these locations, the Marin County Public Works Department, in cooperation with the cities or other agencies as appropriate, should install theft-proof bicycle racks, which are now commercially available.

At locations of high bicycle storage, such as at the ferry terminals, major transit interchange points, and at the Marin County Civic Center, lockers should be provided.

Certain other locations may require installation of theft-proof bicycle racks, and/or lockers. Demand and usage of various locations should be analyzed to determine where any additional racks and/or lockers may be needed.

1. Major Arterial Routes

A system of arterial bikeway routes have been developed, and are described below. The verbal description is intended to indicate corridors of travel, rather than specific routings. Specific routings are usually not finalized until pavement has been laid.

A system of route numbers has been developed, intended as a copy of how highways are numbered. The bikeway numbering scheme is intended as a way to help identify certain routes, and to facilitate bikeway traffic along these routes. The routes are schematically described in Figure 9.

Route 1 - Redwood Route

This is the longest arterial bikeway route, running the entire length of Marin, from the Sonoma County boundary to the Golden Gate Bridge.

The route starts at the Sonoma County boundary at the north, runs south from this point along the Northwestern Pacific Railroad right-of-way to Atherton Avenue in Novato, then west on Atherton Avenue to Redwood Highway, then south on Redwood Highway to Diablo Avenue, then along Diablo Avenue to Hill Road, then east on Hill Road to Indian Valley Road, through the Indian Valley Campus to Sunset Parkway, then down Sunset Parkway to Ignacio Boulevard, then down Ignacio Boulevard to Alameda Del Prado, then down Alameda Del Prado to Highway 101, then south parallel to Highway 101 to Miller Creek Road, then down Miller Creek Road to Las Gallinas Avenue, then down Las Gallinas Avenue to Los Ranchitos Road, then down Los Ranchitos Road to Highway 101, then south parallel to Highway 101 to Lincoln Avenue, then down Lincoln Avenue to Northwestern Pacific Railroad Depot in San Rafael, then south along Northwestern Pacific Railroad right-of-way to Highway 101

undercrossing by Larkspur spur, then on to Tamal Vista Boulevard, then down Tamal Vista Boulevard to Madera Boulevard, then down Madera Boulevard to Tamalpais Drive, then across Tamalpais Drive to Casa Buena Drive, along Highway 101 to Lomita Drive, then west on Lomita Drive to Northwestern Pacific Railroad right-of-way, then south on Northwestern Pacific Railroad right-of-way to Sausalito bikeway route running into Sausalito on Bridgeway, through Sausalito on Bridgeway to Second Street, then over to South Street, then down South Street to Alwxander Avenue, then south on Alexander Avenue to East Road in Fort Baker, through Fort Baker on Congelman Road to bridge approach, onto the Golden Gate Bridge and across to San Francisco.

Route 2 - Tiburon-Mill Valley Route

This route is the Tiburon-Mill Valley Route, and connects downtown Mill Valley to downtown Tiburon and the Tiburon Ferry Terminal.

The route starts at the Mill Valley City Hall, runs down to East Blithedale Avenue, then east on East Blithedale Avenue to Tiburon Boulevard, east on Tiburon Boulevard to Greenwood Beach Road to the existing Tiburon Bikeway, then along the Tiburon Bikeway to downtown Tiburon and the Tiburon Ferry Terminal.

Route 3 - Miller Avenue Route

This is a short route running along Miller Avenue in Mill Valley.

The route starts at the Mill Valley City Hall, runs down to Miller Avenue, then along Miller Avenue to Northwestern Pacific Railroad right-of-way where it joins Bike Route 1.

Route 4 - Ross Valley Route

This route is the Ross Valley Route and connects the cities lying in the Ross Valley.

The route starts at the intersection of Madera Boulevard and Tamalpais Drive, where it joins Route 1, then runs west on Tamalpais Drive to Northwestern Pacific right-of-way then north on the Northwestern Pacific right-of-way to Doherty Drive and Magnolia Avenue,

then north on Magnolia Avenue to College Avenue, up College to Kent Avenue, west on Kent Avenue to Poplar Avenue, up Poplar Avenue to DeWitt Road, west on Lagunitas to Shady Lane, north on Shady Lane to Bolinas Avenue, east on Bolinas Avenue to San Anselmo Avenue, north on San Anselmo Avenue, across Sir Francis Drake Boulevard to Butterfield Road, then up Butterfield Road to Fawn Drive, then up Fawn Drive to Summit Trail, then on Summit Trail to Green Oaks subdivision, then through Green Oaks subdivision and east on Manuel Freitas Parkway to Los Ranchitos Road, where this route again joins Route 1.

Route 5 - Baltimore Spur Route

This is a short route running through Larkspur.

It runs on the Northwester Pacific Railroad right-of-way from Magnolia Avenue and Baltimore Avenue to Tamal Vista Avenue where it meets Bike Route 1.

Route 6 - Larkspur Ferry Terminal Route

This is the Larkspur Ferry Terminal Route.

The route starts at the Larkspur Ferry Terminal and runs up Sir Francis Drake Boulevard to Bon Air Road, then south on Bon Air Road to the Corte Madera Creek Trail.

Route 7 - Miracle Mile Route

This is the Central San Rafael Route.

The route starts at the San Anselmo Hub at the intersection of Sir Francis Drake Boulevard and Greenfield Avenue, where it joins Route 4, and proceeds east through San Rafael on Greenfield Avenue, and then eastward on 2nd, 3rd, or 4th Street to the Northwestern Pacific Railroad right-of-way, where it joins Route 1.

Route 8 - Civic Center Route

This route could be called the Civic Center Loop.

The route starts at the intersection of North San Pedro Road and Merrydale Road, where it meets Route 1, then proceeds east on

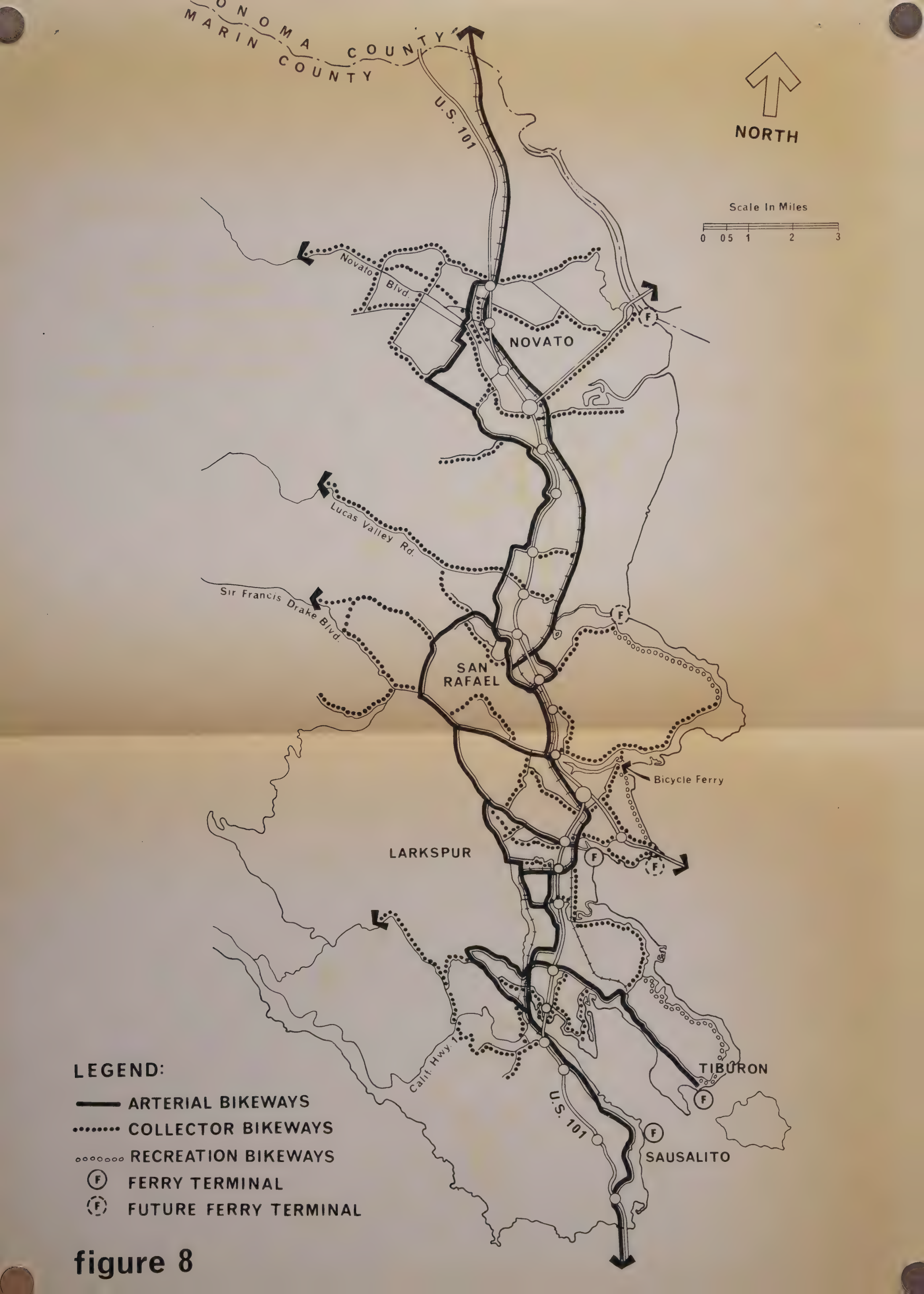

SONOMA COUNTY
MARIN COUNTY
U.S. 101
NORTH
Scale In Miles
0 05 1 2 3
Novato Blvd.
NOVATO
Lucas Valley Rd.
Sir Francis Drake Blvd.
SAN RAFAEL
Bicycle Ferry
LARKSPUR
Calif. Hwy. 1
U.S. 101
TIBURON
SAUSALITO
LEGEND:
ARTERIAL BIKEWAYS
COLLECTOR BIKEWAYS
RECREATION BIKEWAYS
FERRY TERMINAL
FUTURE FERRY TERMINAL

figure 8

North San Pedro Road to Civic Center Drive, then through the Civic Center on Civic Center Drive to the Northwestern Pacific Railroad right-of-way, then south along the Northwestern Pacific Railroad right-of-way to Merrydale Drive, north on Merrydale Drive to join Route 1 at Las Gallinas Avenue.

Route 9 - Novato-Civic Center Route

The route starts at Atherton Avenue and the Northwestern Pacific Railroad right-of-way where Route 1 leaves the railroad right-of-way, through Novato and Ignacio to the Civic Center, where it joins Route 8.

A map depicting the arterial bikeway corridors is shown in Figure 8. The arterial bikeways will be Class I facilities, where possible. If it is not possible to construct Class I facilities for some reason, either Class II or Class III facilities will be provided, depending on the particular situation.

2. Collector Bikeways

A system of collector bikeway routes have also been developed, and are also shown in Figure 8.

The collector bikeways are routes which provide access and egress to the arterial system, as well as provide for local circulation. There are approximately 80 miles of collector bikeways in the Marin County system. These routes are planned to be Class III facilities, which means the only requirement is that the routes be signed as bike routes, except in some particular situations where some minor construction may be required to provide for the free and safe flow of bicycles.

3. Major Bicycle Attractor Locations

The following is a list of locations hereby identified as Major Bicycle Attractor Locations. At these locations the County should encourage installation of theft-proof bicycle racks. Additionally, at some of these locations the County should install bicycle lockers. Demand will be the criteria for determining the quantity and types of facilities to be provided.

The Major Bicycle Attractor Locations are:

1) Downtown Novato

2) Ignacio

3) Indian Valley College Campus

4) Northgate Shopping Center

5) Marin County Civic Center

6) San Anselmo Hub

7) Central San Rafael

8) College of Marin

9) Bon Air Shopping Center

10) Corte Madera Center

11) Downtown Mill Valley

12) Strawberry Shopping Center

13) St. Vincent's School for Boys Site

4. Bicycle - Transit Interchange Points

The following is a list of bicycle - transit interchange points in Marin County. At these locations the County should encourage the appropriate Transit Districts, municipalities, and/or other jurisdictions to install both bicycle shelters and theft-proof racks. At the three ferry terminals, the County and/or the appropriate Transit District should install larger scale shelters and theft proof racks.

1) Novato
(South Novato Boulevard at Rowland)

2) Terra Linda
(Manuel Freitas Parkway at Las Pavadas)

3) Marin County Civic Center

4) San Anselmo Hub

5) Central San Rafael
(4th Street and Heatherton)

6) College of Marin on College Avenue

7) Larkspur
(Magnolia at Madrone)

8) Greenbrae
(Sir Francis Drake Boulevard at South Eliseo)

9) Downtown Mill Valley

10) Sausalito Ferry Terminal

11) Tiburon Ferry Terminal

12) Larkspur Ferry Terminal

5. Additional Points of High-Priority

1) Downtown Novato
2) Indian Valley Campus
3) Ignacio
4) St. Vincent's School for Boys Site
5) Northgate Shopping Center
6) Downtown Fairfax
(Fairfax Manner Area)
7) San Rafael
(Glenwood Area)
8) Corte Madera Center
9) Strawberry Shopping Center
10) Manzanita
(Shoreline Highway at Highway 101)
11) Tiburon-Richardson Bay Park
12) Bolinas-Stinson Union School
13) Miller Creek School
14) Vallecito School
15) White Hill School
16) Adaline E. Kent Middle School
17) Lagunitas School
18) Henry C. Hall School
19) Neil Cummins School
20) Mill Valley Middle School
21) Nicasio School District
22) Hill Junior High School
23) Novato High School
24) San Jose Junior High School

25) San Marin High School
26) Sinaloa Junior High School
27) North Marin High School
28) Del Mar School
29) Reedland Woods School
30) Ross School District
31) Hidden Valley Middle School
32) Red Hill Intermediate School
33) Davidson Middle School
34) Santa Venetia Middle School
35) San Rafael High School
36) Terra Linda High School
37) Lagnaf School
38) Pacific Crest School
39) Madrone High School
40) Martin Luther King School
41) Tomales Elementary School
42) Tomales High School
43) West Marin Elementary School
44) Redwood High School
45) Sir Francis Drake High School
46) Tamalpais High School
47) Mewah Mountain High School
48) San Andreas High School

E. The Recreational Element

The purpose of a recreational bikeway plan is to establish a linear trail system primarily for the recreational activity of bicycling while recognizing other important recreational trail activities of walking, hiking and horseback riding. This will necessitate creation and integration of multi-use recreational trails with existing or newly created transportation routes in order to integrate the two elements.

In order to assess potential routes for inclusion into a recreational trail system, a number of criteria for evaluation must be established.

First of all, there must exist a potential linear corridor of County-wide significance possessing the following characteristics:

1) The recreational path must connect two or more recreational attractors; a) regional recreational facility (California State Park, National Park, County Park); b) community activity center (major City park, community center, bike hostel, college); C) County-wide/local trail project serving an urban area (scenic easements, open spaces, other designated scenic areas).

2) The recreational path should provide a <u>significant trail experience</u> through scenic areas.

A secondary criteria for evaluation of a potential recreational trail system is the need for adequate land area at strategic points suitable for trail links and trail staging areas. These areas are needed to accommodate the cyclist, pedestrian, and equestrian, who arrives by another mode of transportation, and to allow these individuals to identify and travel along a desired route.

Adequate <u>trail link</u> planning guides become important when one considers the types of trail users that must be accommodated. First of all, there must be clear, readable signs (See Figures 3 & 7 for examples.) and proper barriers to prevent entry of incompatible activities. Secondly trail modes should be consolidated within the same corridor; running/hiking/biking, and running/hiking/equestrian. The degree of separation necessary will depend upon the compatibility of the activities. See Appendix 'B' for description of various types of trails by use and physical characteristics.

Adequate <u>trail head</u> planning guides become important in providing for the comfort and overall trail experiences of the recreational user. Trailheads should be located at strategic access points, and should be developed with adequate facilities such as parking areas, hostels, sanitary facilities, picnic areas, shelters, and scenic overlooks.

The Cross Marin Trail, which is the most significant part of the County's recreational bicycle program, is discussed in detail in a separate document. This document is available from the Marin County Parks and Recreation Department.

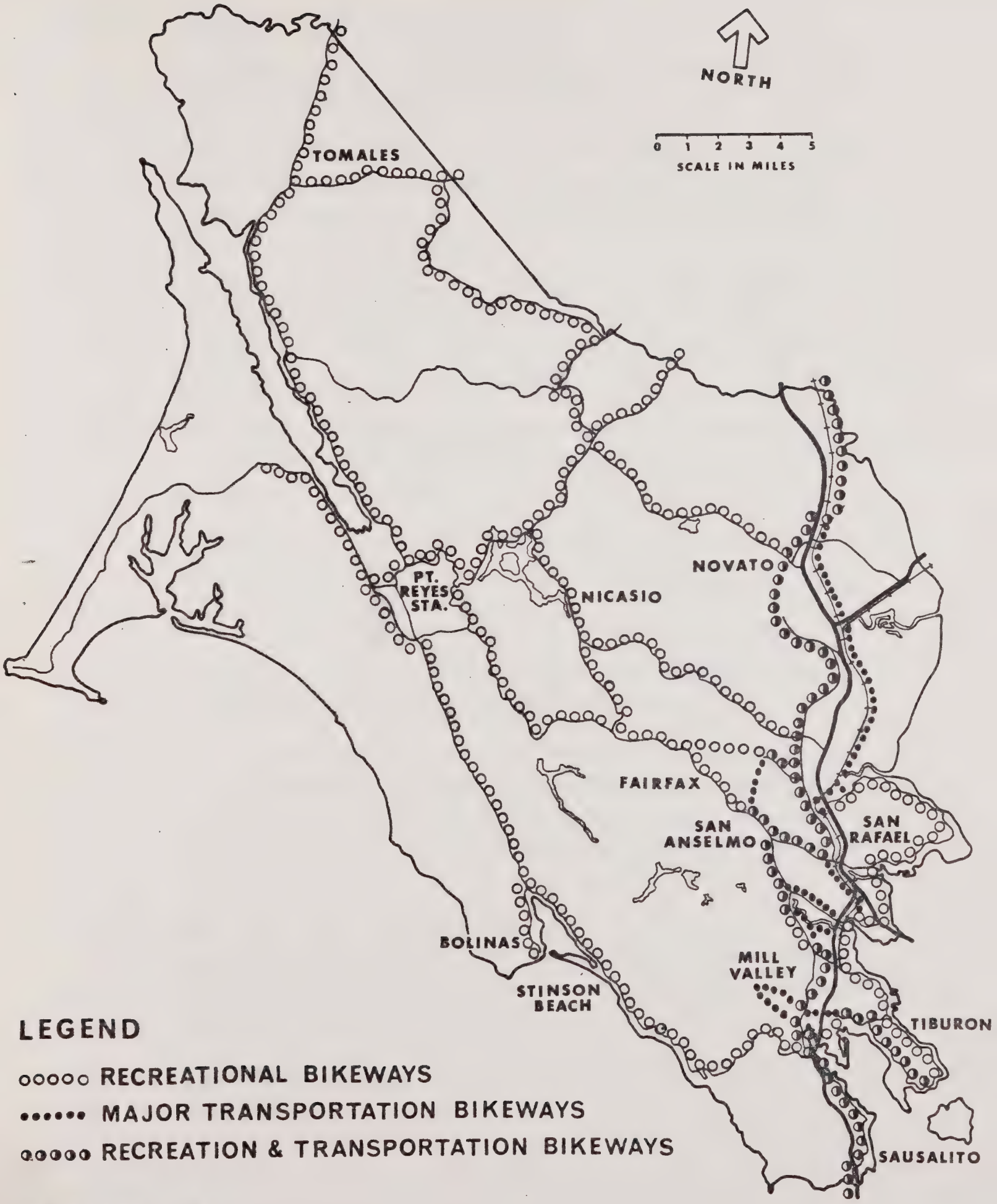

NORTH
0 1 2 3 4 5
SCALE IN MILES
TOMALES
PT. REYES STA.
NICASIO
NOVATO
FAIRFAX
SAN ANSELMO
SAN RAFAEL
BOLINAS
STINSON BEACH
MILL VALLEY
TIBURON
SAUSALITO
LEGEND
RECREATIONAL BIKEWAYS
MAJOR TRANSPORTATION BIKEWAYS
RECREATION & TRANSPORTATION BIKEWAYS

figure 9

CHAPTER IV: THE PILOT PROJECT

The Bikeway Plan proposes a Pilot Project for fiscal year 1975-76, to be conducted by the Public Works Department.

The County has applied for 2% of the monies generated by S.B. 325 -- The Transportation Development Act -- for the purpose of constructing pedestrian and bicycle facilities. These monies total $30,000 for fiscal year 1975-76.

The Public Works Department will complete a contigious bicycle route running from the Golden Gate Bridge to Stafford Lake in Novato. This route will include some Class I, Class II, and Class III bikeways, and some bike/hikeways.

Significant portions of this route already exist. The Sausalito Trail, the Alto Hill Trail, and the Pacheco Hill Trail will become parts of this through route.

In essence, the route will be Route I described in the previous chapter, with two exceptions: It will traverse between Larkspur and San Rafael via the San Anselmo Hub, and its northern terminus will be Stafford Lake rather than the Sonoma County boundary.

In addition, the pilot project will provide the necessary links to connect the Tiburon Trail to the north/south route.

A significant portion of this link involves work parallel to Highway 131, between East Strawberry Drive and Greenwood Cove Drive. CALTRANS is building a Class I bikeway between these two points, at an estimated cost of $60,000; to be shared equally between CALTRANS and the County.

When these projects are completed, there will exist in Marin a County-wide bikeway system linking together the Cities of Sausalito, Mill Valley, Tiburon, Larkspur, Corte Madera, San Rafael, San Anselmo, Ross, and Novato.

This project is significant in that it will be the first County-wide bicycle project.

CHAPTER V: ACCIDENTS, SAFETY, EDUCATION, LICENSING, AND REGISTRATION

A. Bicycle Accidents and The Safety Program

The increased use of the bicycle in the United States has resulted in an increase in accidents, injuries, and deaths associated with bicycle riding. Since 1935 the number of bicycles in this Country has increased more than 20-fold (See Table 1). Fortunately, however, the death rate has not increased in the same manner. In 1935 there were 128 deaths per million bicycles in the United States. By 1960, the death rate per million bicycles had dropped to 14. This reflects a decrease to about 1/10 of what the death rate was 40 years ago. Since 1960 the death ratio has remained relatively constant. The National Safety Council estimates that in 1973 there were 1,150 deaths attributed to bicycle use (see Table 3). This represents an absolute increase of 150% in the number of deaths associated with bicycle use since 1960. In 1973, the number of accidential deaths attributed to bicycle use accounted for about 1% of all accidential deaths occuring in the Country. If accident rates were similar on a per-capital basis in Marin County, it would translate into 1 or 2 deaths per year.

Since 1960, there has been a shift in bicycle associated deaths stratified by age group, with a significant shift toward more deaths in the 15 year old and older age group. In 1960, the under 15 year old age group accounted for 78% of all bicycle deaths in the United States, but by 1973 this percentage had dropped to under 50%. Conversely, in 1960 the 15 year old and older age group accounted for only 22% of all bicycle deaths, while in 1973 this older age group accounted for over 50% of all deaths associated with bicycles. There dramatic shifts in death rate statistics reflect the increased use of bicycles by older age groups.

Falls and collisions are the most common type of bicycle mishaps. Bicycle falls tend to occur quite frequently, especially among younger bicyclists, however, they rarely result in injuries. Collisions are the most serious type of bicycle accident, frequently resulting in injuries or death. The consensus of various studies indicates that

TABLE 3

BICYCLE DEATH RATE STATISTICS

YEAR	BIKES (millions)	DEATHS	DEATH RATE*	PER CENT OF DEATHS BY AGE			
				0-14	15-24	25+OVER	ALL AGES
1935	3.5	450	1.280	57	29	14	100%
1940	7.8	750	.959	48	39	13	100%
1945	9.0	500	.555	56	22	22	100%
1950	13.8	440	.318	82	9	9	100%
1955	23.1	410	.178	71	12	17	100%
1960	28.2	460	.163	78	9	13	100%
1965	38.8	680	.175	64	18	18	100%
1970	56.5	820	.145	66	15	19	100%
1972	71.4	1,100	.154	50	27	23	100%
1973	80.0	1,150	.144	49	30	21	100%

*Deaths per million bicycles in use.

Source: National Safety Council, Accident Facts, 1974 edition.

about 3 out of 4 bicycle accidents occur at intersections. Indications are that about 50% of all bicycle accidents involve an automobile, and of these bicycle-automobile accidents, a majority are caused by the bicyclists not obeying some law or safety regulation. Invariably the bicyclist is the loser in the bicycle-automobile conflict.

The University of California at Los Angeles has compiled some statistical data denoting contributing circumstances to bicycle accidents over a recent 29-month period in the County of Los Angeles. This data is presented in Table 4.

From this study it was found that 2,778 accidents involved motor vehicles and bicycles. Of these 11.4% resulted in no injury, 17.4% resulted in no visible injury (complaint only), 60.5% resulted in a minor visible injury, 9.7% resulted in severe injury, and 1% resulted in death to the bicyclists.

Inexperience is undoubtedly one of the greatest contributing factors to bicycle accidents, especially among school-aged children.

A bicycle educational and safety program should be initiated in all of the elementary schools in the County, starting in the first grade. This educational and safety program could be easily included in the regular recreation program of the schools. The County should provide literature to the schools that can be handed out to the children for their use, and for the education of their parents.

It is estimated that one in four bicycle accidents occur as the result of mechanically defective bicycles. The Bicycle Manufacturers' Association, whose members produce about 85% of all domestic bicycles, have established a set of voluntary regulations for domestic bicycle construction which should result in a significant reduction of accidents caused by mechanical defects.

TABLE 4

CONTRIBUTING CIRCUMSTANCES ASSOCIATED WITH BICYCLE ACCIDENTS IN A RECENT 29 MONTH PERIOD IN LOS ANGELES.

CONTRIBUTING CIRCUMSTANCE	BICYCLISTS[1] TOTAL ACCIDENTS[3]		MOTORISTS[2] TOTAL ACCIDENTS	
	Within Intersection	Non Intersection	Within Intersection	Non Intersection
No Violation	227 (30.6%)	514 (24.8%)	393 (53.9%)	1243 (60.7%)
Speed	3 (0.4%)	12 (0.6%)	15 (2.1%)	70 (3.4%)
Failure to Yield	134 (18.1%)	628 (30.3%)	203 (27.9%)	230 (11.2%)
Wrong Side	133 (17.9%)	264 (12.7%)	5 (0.7%)	32 (1.6%)
Ran Stop Sign	101 (13.6%)	30 (1.5%)	16 (1.4%)	4 (0.2%)
Ran Signal	24 (3.2%)	16 (0.8%)	17 (2.3%)	21 (1.0%)
Improper Passing	1 (0.1%)	9 (0.4%)	4 (0.6%)	35 (1.7%)
Following Too Close	0 (0.0%)	9 (0.4%)	0 (0.0%)	15 (0.7%)
Improper Turn	20 (2.7%)	86 (4.1%)	17 (2.3%)	25 (1.2%)
Other Improper Driving	46 (6.2%)	233 (11.2%)	40 (5.5%)	231 (11.3%)
Other Violations	49 (6.6%)	257 (12.4%)	19 (2.6%)	138 (6.7%)
Unsafe Lane Changes	4 (0.5%)	17 (0.8%)	0 (0.0%)	5 (0.2%)

1-Accidents involving two or more parties.

2-Accidents involving one bicycle and one motor vehicle.

3-Percentages are given for each catagory.

The California State Legislature has recently enacted legislation, Assembly Bill No. 3329, which includes the following safety provisions:

1) No person shall operate a bicycle on a roadway unless it is equipped with a brake which will enable the operator to make one braked wheel skid on dry, level, clean pavement.

2) No person shall operate on the highway any bicycle equipped with handlebars so raised that the operator must elevate his hands above the level of his shoulders in order to grasp the normal steering grip area.

3) No person shall operate upon any highway, a bicycle which has been modified or altered in such a way as to cause the pedal in its lowermost position to be more than 12 inches above the ground.

4) Every bicycle operated upon any highway during darkness shall be equipped with a lamp emitting a white light maintained so as to be visible from a distance of 300 feet in front of the bicycle. A lamp emitting a red light maintained so as to be visible from 300 feet to the rear may be used in addition to the red reflector required by the provision below.

5) No person shall sell or offer for sale a pedal, reflex reflector, or reflectorized tire for use on a bicycle unless it is of a type approved by the Department of Motor Vehicles.

6) No person shall offer for sale a new bicycle or pedal for use on a bicycle that is not equipped with a white or yellow reflector on each pedal which is maintained so as to be visible from the front and rear of the bicycle during darkness from a distance of 200 feet.

7) No person shall sell or offer for sale a new bicycle unless it is equipped with reflex reflectors as follows:

   a) A white reflector on the front;
   b) A red reflector on the rear; and

c) A white or yellow reflector on each side forward of the center of the bicycle and a white or red reflector on each side to the rear of the center of the bicycle. Bicycles which are equipped with reflectorized tires on the front end and rear end need not be equipped with side reflex reflectors.

8) No person shall operate a bicycle upon any highway unless it is equipped with reflex reflectors or reflectorized tires pursuant to the provisions listed above. Such reflectorized tires or reflectors on the front, sides, or rear of a bicycle shall be maintained so as to be visible from a distance of 500 feet when directly in front of lawful lower beams on a motor vehicle and shall be of a type approved by the Department of Motor Vehicles.

These safety regulations should help to keep bicycle accidents to a minimum.

B. Education and Licensing

The safety of the bicycle rider is ultimately the responsibility of the bicycle rider. The County of Marin could spend endless amounts of money constructing facilities to make the bicycle user immune from conflicts with automobiles, but obviously this type of approach is practically and financially unfeasible.

The bicycle rider must be responsible for his own safety, just as the automobile driver is. For this reason it is imperative that the school system undertake a program to instruct bicyclists in the safe use of their vehicles.

The Board of Supervisors, on February 4, 1975, endorsed a policy indicating that the appropriate state or local agency should implement the following:

1. Mandatory class in bicycle laws, operation and safety for all students early in the primary grades. Accompanying this program, backup material to be sent to all parents of these children.

2. In recognition of the fact that the accident rate for grade school age cyclists is greater than for any other age group, all persons 12 years of age and older must have a license to operate a bicycle on public roads.

3. Motor vehicle licensing literature and examinations should include laws related to bicycles, their handling and safety, and rights and obligations of their users.

C. Bicycle Registration Program

Because of the bicycle thievery problem, there is a need for a bicycle registration program, similar to the motor vehicle registration program, to both discourage thievery and to aid in the recovery of stolen vehicles.

The California State Legislature has recently enacted Assembly Bill No. 3329, which is a partial step toward solving the problem. However, more is needed.

The Board of Supervisors should propose legislation to the State Legislature to change the name of the Department of Motor Vehicles to the Department of Vehicles, and to require same to be responsible for a State-wide bicycle registration system.

As an interim measure, the County should coordinate a County-wide bicycle registration program. The Board of Supervisors, on February 4, 1975, indicated their feeling that the present optional bicycle registration program should be made mandatory.

The funds generated from this program should be used for the educational program.

Both the interim registration program to be administered by the County, and the proposed State-wide bicycle registration program would be generators of revenue which could and should be put into bicycle facilities.

D. Proposed State Legislation (1975-76 Session)

Four bills involving bicycle education, safety, and facilities are

presently being presented to the State Legislature (S.B. 937, 938, 939, & 940). If passed H.B. 3329 (equipment requirements) will be superceded by S.B. 940, and a pilot program concerning traffic safety and education will be initiated (S.B. 938). S.B. 937 would allot $60,000 toward study of existing nonmotorized transportation facilities in order to establish design criteria for such facilities in the future. S.B. 939 would make some corrections, additions, and deletions to the California Vehicle Code in relation to bicycles and their use.

CHAPTER VI: IMPLEMENTATION, STAGING, COSTING, AND FUNDING

A. Implementation

After the adoption of this Bikeway Plan by the Marin County Board of Supervisors and all of the other appropriate bodies, its implementation will become the responsibility of the Parks and Recreation Department and the Public Works Department.

The Parks and Recreation Department will be responsible for development of multi-use recreational trails which includes the Cross Marin Trail, now in the master planning and design stage.

The Public Works Department will basically be responsible for the arterial system and the collector system needed to provide a balanced network of bicycle transportation facilities. The transportation system of bikeways indicated in Figure 8 provides a backbone network which may be expanded as is deemed appropriate.

The primary use of these facilities will on occasion overlap, i.e., a transportational bikeway (arterial or collector) may, depending on the route, be used by multiple means of transportation. In these cases, responsibility will be joint between the two departments and the routes will be appropriately signed for multi-use.

The Parks and Recreation Department and the Public Works Department will work together to bring this plan into realization, The two departments will use the Parks, Recreation, and Open Space Commission, and its "Trails Committee" as the main vehicle for interface with the public to insure that the needs of the public are understood.

B. Staging and Costing

The exact process of staging the bikeway system is beyond the scope of this document. However, as a general rule, the routes in greatest demand will be developed first. Exact staging on a year to year basis will be proposed by staff of the Parks and Recreation Department and the Public Works Department, after consultation with the Parks, Recreation, and Open Space Commission and its Trails Committee, and will then be submitted to the Board of Supervisors for final approval.

The conceptualized plan, outlining where the bikeway routes will be, is the heart of this document. (See Figures 8 and 9.) It is understood that those facilities which are of the most apparent need will be constructed first.

The recreational facilities consist of approximately 300 miles of route.

The Cross Marin Trail, a primarily recreational facility, is projected to cost $1,400,000. This trail is about 37 miles in length. A large part of the trail will be separated from existing roadways and consequently the rather high cost per mile of route. Senate Bill 1032, appropriating $600,000 of State trails monies to the Cross Marin Trail, has recently been signed by Governor Brown. The County is now seeking federal funds as matching money, for a total potential of $1,200,000 of outside funding.

A significant portion of the 300 miles of recreation trails will be signed routes along existing roadways. The total cost for the development of the entire recreational system as now planned is approximately $2,000,000. The detailed breakdown is as follows:

Type	Miles	Cost Per Mile	Total Cost
Class I	50	$35,000	$1,750,000
Class II	50	1,200	60,000
Class III	200	600	120,000
		Total	$1,930,000

The transportation bikeways consist of approximately 55 miles of arterial routes and approximately 80 miles of collector routes.

Of the 55 miles of arterial transportation bikeways, about 1/2 will be Class I, 1/4 will be Class II, and 1/4 will be Class III. The approximate cost of the arterial portion of the transportation bikeways will then be:

Type	Miles	Cost Per Mile	Total Cost
Class I	28	$35,000	$ 980,000
Class II	14	1,200	16,800
Class III	13	600	7,800
		Total	$1,004,600

The collector bikeways consists of about 80 miles of route. Of this about 1/2 will be Class II and 1/2 will be Class III. The approximate cost of the collector system will then be:

Type	Miles	Cost Per Mile	Total Cost
Class II	40	$1,200	$48,000
Class III	40	600	24,000
		Total	$72,000

Adding this to the cost of the arterial system:

Collector System	$ 72,000
Arterial System	1,004,600
Total Transportation System	$1,076,600

And then adding the cost of the Recreational System:

Transportation System	$1,076,600
Recreational System	2,000,000
Total System Contruction Cost	$3,076,600

Another cost to be considered is maintenance. Maintenance costs average $500 per mile, per year, for separate facilities.

Assuming that the entire system, 435 miles, will be completed by 1985, and assuming that construction will be spread evenly over the ten-year period, it may be estimated that maintenance costs for the next ten years will be approximately $250,000.

Adding this to the construction costs:

Total Construction Costs	$3,076,600
Maintenance Costs	250,000
Total	$3,326,600

Another cost item to be considered is the provision of bicycle amenities, such as bike racks, lockers, rest areas, etc. As a very rough estimate, it may be assumed that the total cost incurred in this factor would be $250,000. These figures do not anticipate the need to buy any land.

Adding this figure to the total construction cost, produces the Marin Bikeway Plan system cost of:

Construction and Maintenance	$3,326,600
Amenities	250,000
Grand Total Marin Bikeway Plan	$3,576,600

It must be pointed out that this is a very rough estimate, and could vary widely, dependent upon many contributing factors.

NOTE: There is no intention that all of the facilities outlined in this plan need or must be developed. The cost figures are predicted on the assumption that if everything were constructed, this is what it would cost.

All costs are based on 1975 prices and subject to annual inflation increases that could be 10%/year or even higher.

CHAPTER VI: IMPLEMENTATION, STAGING, COSTING, AND FUNDING

A. Implementation

After the adoption of this Bikeway Plan by the Marin County Board of Supervisors and all of the other appropriate bodies, its implementation will become the responsibility of the Parks and Recreation Department and the Public Works Department.

The Parks and Recreation Department will be responsible for development of multi-use recreational trails which includes the Cross Marin Trail, now in the master planning and design stage.

The Public Works Department will basically be responsible for the construction of the transportation bikeways. These include both the arterial system and the collector system needed to provide a balanced network of bicycle transportation facilities. The transportation system of bikeways indicated in Figure 8 provides a backbone network which may be expanded as is deemed appropriate.

The primary use of these facilities will on occasion overlap, i.e., a transportational bikeway (arterial or collector) may, depending on the route, be used by multiple means of transportation. In these cases, responsibility will be joint between the two departments and the routes will be appropriately signed for multi-use.

The Parks and Recreation Department and the Public Works Department will work together to bring this plan into realization. The two departments will use the Parks, Recreation, and Open Space Commission, and its "Trails Committee" as the main vehicle for interface with the public to insure that the needs of the public are understood.

B. Staging and Costing

The process of staging the bikeway system is beyond the intent of this document.

This plan proposes a general guide to facilitate the development of bicycle amenities throughout the County.

Development of various bicycle related projects on a year to year basis will be determined by staff of the Parks and Recreation Department and of the Public Works Department, after consultation with the Parks,

Recreation, and Open Space Commission and its Trails Committee, and then submitted to the Board of Supervisors for final approval.

C. Funding

Funding of bicycle facilities in Marin County will come from three sources: Federal, State, and Local.

1. Federal

Federal government has provided that up to $2,000,000 can be allocated to California each year for construction of bikeway facilities. These monies can be applied for by the County under the 'Federal Aid Urban', or the 'Federal Aid Secondary' programs. Other Federal programs have potential for bicycle path funding, such as the State of California's share of the Land and Water Conservation Fund.

2. State

The State government has provided, under Senate Bill No. 36 about $1,000,000 per year for bicycle facilities construction. Over the next 10 years about $200,000 of these monies will come into Marin.

Another source of State generated monies is Senate Bill No. 325, the gasoline sales tax. Two percent of gasoline sales taxes generated in Marin County can be used for bicycle facilities. This amounts to about $30,000 per year. Over the next 10 years this will total to about $300,000.

Additionally, the California State Department of Transportation (CALTRANS) has indicated that they will be willing to put monies into bikeway facilities along State routes, where a real need can be shown. Several projects recently completed, such as the Pacheco Hill Trail, and the Alto Hill Trail, have been partially funded by CALTRANS. Also, CALTRANS is presently pursuing a project to allow bicycle access to Point San Quentin, along Route 17. This route is a freeway in the extreme eastern end of the peninsula, and therefore will require that special bicycle facilities be provided to allow bicycle access to the Point. This project will be entirely funded by CALTRANS.

CALTRANS is also presently conducting a feasibility study, looking into providing one lane of the Richmond/San Rafael Bridge for bicycle use on weekends. This project is also being completely funded by CALTRANS.

Other State programs include the Trails and Hostels fund, as well as State Bond Act of 1974.

3. Local

Local monies will come from two sources: Cities and the County.

a. Cities: Most of the incorporated cities in the County are developing their own bikeway facilities within their local jurisdictions. These local systems will interface with the Countywide system.

b. County: County monies are budgeted into the Parks and Recreation Department and the Public Works Department.

The County Parks and Recreation Department has budgeted for general trail construction approximately $100,000 per year for the past several years, and similar amounts are proposed for future fiscal years. Based on past experience, it is assumed that a major portion of these monies will be spent on bicycle facilities within the recreation network.

The Public Works Department has indicated that an expenditure of $200,000 per year for transportation-related bicycle facilities would be desirable. It is however, understood that the Board of Supervisors cannot and will not commit future Boards for expenditures of this kind. It is apparent that the County's commitment to seek outside funding, both State and Federal, must become an integral part of the total funding program. The Public Works Department will take the lead and pursue all outside funding potential for transportation related bicycle facilities, and the Parks and Recreation Department will pursue all outside sources for recreation related bicycle and trail facilities. Where a proposed bicycle facility lies within or would benefit one of the numerous Federal or State Parks within Marin, the County will seek assistance directly from the affected

agency as an appropriate capital expenditure for improvements to the facility.

With increasing awareness by governmental agencies at all levels towards recognizing the bicycle as a viable alternate means of transportation as well as a long-established form of recreation, it is believed that outside funding will become more readily available.

APPENDIX 'A'

A
BIKEWAY POLICY
FOR MARIN COUNTY

Prepared by Marin County Parks
and Recreation Department

April 1974

CONTENTS

Introduction	1
Background	1
Policy Need	2
Proposed Policy	3
Suggestions for Implementation	3

INTRODUCTION

Is the current Nationwide adult interest in bicycling another fad or will it become a significant mode of transportation in the future? Nationwide trends indicate the latter. Bicycle ownership has increased dramatically with adult cyclists more evident on the streets. This mushrooming increase in adult use of the bicycle for transportation, as well as for recreation is due largely to the many advantages of the bicycle. Travel time is often less than the automobile for distances up to five miles in congested areas of the city. Low initial cost and low maintenance costs make the bicycle economically advantageous in comparison to other modes of transportation. Additionally, the bicycle has low energy requirements, and produces few pollutants.

Marin has excellent conditions for bicycle riding. Our mild climate is extremely conducive, as the mean monthly temperature rarely drops below 50°F. There are usually over 200 clear days per year, and precipitation of more than 1/10 inch per day occurs infrequently. The topography of Marin, with its narrow valleys and hills, provides many suitable riding areas in certain corridors. The scenic beauty of its bay shore and coastline combine with its pastoral rural scenes and small communities to make it one of the most desirable areas in Northern California to cycle.

We as residents, are able to travel within the County by automobile with relative ease. However, when we attempt to travel by bicycle in the urban areas of our County, there are a number of difficulties to overcome in reaching our destination. Because of the auto-oriented constraints imposed on our roadways, we are forced to rely on the auto even for extremely short trips; and, as automobile traffic increases, our roadways become more hazardous and there is a greater opportunity for bicycle accidents and for mutual suspicion and distrust between motorists and bicyclists. In Marin, as elsewhere, there is a need to identify the problems a cyclist encounters and determine ways in which he can be accommodated in order to make his trip enjoyable and safe.

BACKGROUND

With the adoption in 1969 of the "Bike Path Master Plan" as an amendment to the County Parks and Recreation Plan for 1990, the ground work was laid for a comprehensive bikeway system. Implementation of the Master Plan has been started with over ten miles of separated path construction by the County, most of it for recreational use. In addition, some bike paths have been constructed and bike routes have been signed in cooperation with local communities and some have accomplished bike path construction and signing with their own efforts. The State of California has also assisted in construction of paths along State roadways.

At present, the Parks and Recreation Department budgets an amount in a Trails Fund each year with a tentative project list as approved by the County Parks, Recreation, and Open Space Commission. If the Board of Supervisors approves the budget request, the Department then proceeds to secure

right-of-way, prepare plans, and begin construction within the fiscal year. The plans and contracts are reviewed and approved through the normal parks projects procedure.

The Department of Public Works has also constructed two bike paths through its safety road widening program, and may continue this program where the situation warrants.

POLICY NEED

Marin County's present approach to bikeways is not solving some of the problems and will not fullfill all of the present or future needs of Marin's bicycling population. The County's experience in planning, building, and operating bikeways has suggested changes, and bicyclist's needs become more clear as the number of riders and their skill increases. A new bikeway policy is needed for the County to respond to the following:

1. Streets and roads are now planned, designed, and constructed solely for automobile traffic without regard for bicycles. The existing or proposed streets or roads are often the most usable, convenient, and available bikeways if they can safely accommodate bicycles.

2. Bicycles are a proven, readily available, inexpensive, efficient, and environmentally sound means of transportation; transportation planning in Marin only just started to include bicycles.

3. Recreational bicycle riding has become extremely popular in Marin, with perhaps 50% of the children and adults owning bikes. Few safe recreational paths now exist and those are frequently dangerously over-crowded.

4. The State, County, and cities now all have their own design and construction standards for bikeways, creating confusion and inconsistencies for riders. Many of the present standards are inadequate and unsafe.

5. Bicycle traffic safety is only sporadically taught in schools and riding skill training is not provided at all. A six year old inexperienced bicycle rider can at present, ride on the same public streets, subject to the same laws as a mature, licensed auto driver.

6. Bicycles could be an ideal, individual connector between home and bus, ferry, or future transit. Most of Marin's commuters are within riding distance of bus stops, many already have bikes and the climate is usually suitable; yet no buses in Marin will now accommodate bikes and bus stops have no secure weatherproof places to leave bikes.

PROPOSED POLICY

The policies of the County for planning, design, construction, and operation of bikeways in Marin are proposed as follows:

1. The County recognizes the need for providing safe accommodation for bicycling in all public streets and roads and encourages Cities and the State to do the same for street and roads projects in Marin. New road construction and repair projects shall be planned and designed so as to accommodate bicycles safely as well as motor vehicles.

2. The County recognizes bicycles as a significant transportation mode to be incorporated into transportation planning and construction efforts and to be connected to and balanced with other transportation forms.

3. The County shall continue the program of providing recreational bikeways along scenic routes and connecting to recreational areas. For maximum aesthetic enjoyment and safety, these bikeways should be separate from roads where possible.

4. The County shall develop uniform standards for bikeway design, construction, signing, and safety devices. These standards will be coordinated with the State standards and the County encourages their use by the various cities and other agencies.

5. The County supports bicycle traffic safety education and skills training programs in the schools, police departments, recreation departments, and other organizations directed toward new or young riders.

6. The County will support Statewide and local legislative efforts to establish bicycle safety rules as necessary to supplement the State Vehicle Code and apply to separate recreational bike paths; and will support enforcement and education programs which may be necessary.

SUGGESTIONS FOR IMPLEMENTATION (Not Policy)

In order to implement these comprehensive new policies, it will be necessary for the Departments of Public Works, Planning, and Parks and Recreation to work cooperatively with other County departments, the State of California, and other Cities and agencies in the County. Many items of the work program and schedule cannot be identified until detailed discussions begin; however, the following is recommended to begin implementation:

1. The County should create the position of Bikeways Engineer to coordinate and implement the transportation bikeways policies and to provide technical advice in bikeway planning and implementation of recreational paths. The Bikeways Engineer should have a thorough knowledge of bicycle technology and requirements and should be part of the Public Works Department.

2. A survey of Marin's bicycle riders and their needs and of current bikeway thinking and practice, and a revised Marin Bikeway Master Plan should be prepared to reflect changes and anticipate future needs. A project team with a representative each from the Balanced Transportation Program (Dept. of Public Works), Traffic Engineering, (Dept. of Public Works) and Park Planning (Parks & Recreation), coordinated by the Bikeways Engineer, should be responsible. Staff time and funds for this study should be allocated by each department in the 1974-75 fiscal year. The revised Bikeways Master Plan should be completed for distribution and discussion by January, 1975.

3. The County Public Works Department should have all responsibility for provision of bikeways in the road system, and should revise road standards as necessary and propose bikeway design, construction, signing and safety standards by June 1975.

4. The County should consider bikeways as part of the Balanced Transportation Program, make projections for planning and provide for connections between bicycles and other modes of transportation.

5. The County Parks and Recreation Department should be responsible for recreational bikeways and should continue the existing bike path program for the present. New standards for recreational paths should be proposed and safety rules and enforcement suggested.

##

APPENDIX 'B'

TRAILS AS DEFINED BY USE AND PHYSICAL CHARACTERISTICS

Purpose

Trail is a linear parkland established primarily for the recreational activities of walking, hiking, bicycling, and horseback riding.

Types of Trails

1. Walking/Hiking Trails: There are two essential and different primary users and they pose different requirements.

    a. Schoolchildren, commuters and shoppers who are obliged to walk to and from various locations. This has the highest priority owing to their obvious need to be kept safe from vehicular and other accidents. Generally this type of trail will require an improved path, perhaps with paving, since most users will not be using special hiking footwear. However, the character of the type of trail should still clearly be rural and not urban, but it would be an (almost) all-weather trail, sometimes referred to as lanes and paths.

    b. Recreational walkers and hikers can be expected to use a more rustic, less improved, type of trail that can be out of general use during the rainy season.

    c. These trails should be assigned the most advantageous locations when more than one trail exists in a corridor and should be given priority over all other tails.

2. Jogging/Running Trails: These should be a minimum of 5 feet in width for two-way traffic and should have a spring rather than solid, base; grass is fine if kept mowed. If grass or other plant material is to be the bed of the trail, an adjacent 5-foot strip should be established to allow alternating use and reconstruction.

3. Recreational Bicycling Trail: While this use can be compatible with pedestrian trail use on multi-purpose paths, these uses are best kept separate owing to the potential for accidents that is engendered by encouraging users with very different rates of speed. Therefore, separate trails for this use are preferred and should be:

a. A 10-foot wide (minimum) paved two-way traffic trail with an optional center stripe.

b. A 5-foot wide paved one-way trail.

c. "Bicycle" is defined here as a two-wheeled light vehicle propelled by feet pedals.

4. High-speed Touring/Commuting Bicycling Trails (Bikeways): This use is not compatible with any of the other trail uses listed here, specifically including recreational bicycling; this is high-speed bicycling.

   a. A 10-foot wide (minimum) one or two-way traffic trail with center stripe, to be separated from any other users or other trails in the same corridor. Must be paved and only constructed where it is deemed absolutely necessary by existing terrain and/or pre-existing roadways. (Class I Bikepath)

   b. At least a 5-foot wide extension of the highway apron, with painted line but no curb separation; for one-way traffic; must be paved. This must be designated "no car parking" but may be signed by bicycles. (Class II Bike Lane)

   c. A route identified by signing, but without any other identifying characteristics. (Class III Bikepath)

5. Equestrian Trail: This may have sawdust, shredded bark, or other supplements added to the trail, but should not otherwide be paved. A 5-foot width (minimum) is required for each directional lane of traffic.

6. Multi-purpose Path: Paths not restricted to a single use. There are two types:

   a. Walking/hiking/jogging/recreational bicycling path: must be paved; should be 10-feet minimum width. (Bike/Hikeway)

   b. Walking/hiking/equestrian path: must not be paved; should be 10-feet minimum width.

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